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ABSTRACT

This paper (1) presents observations about the major paradigms and assumptions that have historically shaped media research; (2) encapsulates the activities, thinking, and paradigms of the present; and (3) reports on a study in which 100 theoreticians and researchers were asked to respond to 50 hypothetical statements about media in the learning process as a way to sample current points of view. From the 42 responses, frequency data were determined for each of seven categories on a "valid to not valid" scale and for the choices of whether a particular statement was important or not important for research. Most of the statements that were regarded as valid and important for research followed the research paradigm that is looking for a match between the coding (critical elements in media) and the repertoire of the learner. Also provided are the Questionnaire on Theories about Media and Learning and the study data for the 42 respondents. (LMM)

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Theoretical Bases for Research in Media

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Theoretical Bases for Research in Media

A persistent problem facing teachers and researchers alike is finding the answer to the question: What point of view should I assume and what evidence should I use to determine the effects of media upon learners and the ways that learners utilize media to perceive and process information? After many years of research in media this same question is still being asked and is still largely unanswered, at least to the degree that there are absolutes to guide educators in making decisions. Yet, looking at this situation from an historical perspective, developments over the past ten to fifteen years give promise of more definitive directions.

My intentions in this presentation are three-fold. One is to make a few observations about the major paradigms and assumptions that have shaped research in the past. A second is to encapsulate the activities, thinking, paradigms of the present. A third is to report on the results of asking 100 theoreticians and researchers to respond to 50 hypothetical statements about media in the learning process as a way to sample current points of view.

It is probably fair to say that most studies of media applications to instruction in the first five or six decades of this century were built upon limiting theoretical positions. That is, the effects of media upon learners were analyzed primarily as stimulus presentations which were to have a direct influence upon subsequent behavior. Learners were assumed to be reactive and under stimulus control. For example, in 1963, Finn, in his

definition of the field as "instructional technology," suggested that it was ". . . a branch of educational theory and practice concerned with the design and use of messages which control the learning process." But there were others who had a different view. Several years earlier than Finn, Carpenter (1957) contended that ". . . teaching materials are effective . . . depending on the degrees of their personal relevance to learners . . . . The organism or individual interposes its entire relevant life history between the stimulus material and his or her response." In a similar vein, Hartman (1963) in a review of learning theory, emphasized ". . . facilitation or interference with learning that arises from the cognitive organization the respondent imposes upon the message."

While there were others thinking as Carpenter and Hartman, most media studies were characterized in the familiar "gross comparisons" format. Such research seemed a natural reaction to the expanding availability of media through federal funding and the eagerness of producers to push for adoption. It seemed that there was more of a need to prove the utility of media for the improvement of education than there was a need to analyze the peculiar characteristics of media themselves. Much research studied learning <u>with</u> media rather than studying <u>about</u> media effects upon learning. All of us are familiar with the oft-repeated phrase "no significant differences" that has characterized such research. Subsequent analyses have criticized the assumption that global forms of media, such as television or films, could be regarded as unambiguous entities that somehow could be

described and controlled to determine a cause and effect relationship with any precision. Additional criticism focused on the theoretical assumption that regarded learner responses as being directly influenced by the stimulus input, with little regard for either the contributions to outcomes of learner idiosyncracies or the peculiar characteristics of the media themselves.

More recent analyses of viable ways to conduct research and to define the nature of fundamental research questions have focused on the confounding effects of uncontrolled variables. Clark (1983) for example, has suggested that much of media research--that is, that which has been reported as media research--has actually been a study of variable methodologies and settings in the uses of media. I would tend to agree, but with a recognition that there have been exceptions. One that comes to mind is the film studies done under Carpenter's directions in the Instructional Film Program at Penn State back in the 40s and 50s. In some of those studies there were deliberate analyses of variables within films themselves as these affected the performance of subjects. On the other hand, subjects were not questioned to determine which variables were preferred; neither were learner repertoires explored to determine what affected their interpretation of stimulus elements.

Added to the problem of determining defensible theoretical paradigms for research in media are assumptions about the conditions necessary in a

research setting to derive generalizations from methods and statistical analyses. I refer to the controversy between the assumptions and arguments of those who take a reductionist view of research and those who advocate naturalistic inquiry as a more realistic approach to what life is outside the laboratory setting (Magoon, 1977; Guba, 1981). I do not intend to discuss the intricacies of each point of view, but rather to suggest that our initial orientations to what needs to be investigated and under what conditions quite logically affects our theoretical orientations. For example, our attempts to control all conditions, either by statistical manipulations or tight controls of the situation and subjects, are based on assumptions that such controls are possible in the first place and that validity and generalizability are possible outcomes, thus explaining plausible defensible cause and effect relationships. An assumption is also made that reactions of learners as groups are indicative of the true picture about individuals in that group. The opposite view by those who advocate naturalistic inquiry is that the assumptions of the reductionists are untenable, given the reality of the interaction of social, contextual, and personal factors that affect learner response. Each approach to inquiry assumes its own conceptualization of the nature of learners and becomes the starting point for judging what should be observed. On the other hand, both methods study the effects of variable media characteristics for determining optimum learning and conditions. But the extent to which each method takes into account relevant factors becomes an argument

that inevitably leads to judging whether all things needed for a comprehensive answer were included in the research activity.

Most of us are probably familiar with the conditions that have brought about changes in our views about media/learning relationship since the days when media were considered as control mechanisms for learner behavior. For purposes of continuity, let me recall briefly some significant forebears of current rationales in our field.

Support for a refined look at media/learning relationships came from a number of quarters. Government sponsored research through the National Defense Education Act supported the traditional gross comparative studies, but also fostered investigations into the programming of instruction, which in turn had an important influence on the questioning of how learners perceived and processed information. While there was an emphasis in programmed instruction research that compared linear or branching methods for presenting information, there was also, through the so-called 90-90 criterion for the validation of programmed material, attention paid to the reactions of individual learners to information displays.

A more recent movement, Trait-Treatment-Interaction (ATI), is based on the premise that having knowledge of the interactive effects of learner aptitudes with instructional treatments would make it possible to predict the proper types of methods and materials to insure desired learner responses. But ATI has been criticized for basing measurement on a

"moment-in-time" in the life of a learner as a defensible basis for predicting future performance. The continuing problem not only for ATI but for all types of research methodologies and theoretical orientations, is that learners are dynamic individuals changing constantly as more information is processed each passing day. What continues to cause idiosyncratic responses of learners is still quite elusive.

Clearly, the major focus today is upon the processes by which a learner perceives the environment, processes and stores information, and retrieves it for use in communication. This emphasis has come about because of the recognition that learners are indeed idiosyncratic, that each learner is a product of many experiences which compose a life, and that messages appear only to be meaningful as each person gives them meaning. Relevant to this refined look at media/learner relationships, Glaser (1976), almost a decade ago proposed that there were four components of a psychology of instruction: the analysis of competent behavior, the description of initial states, the acquisition of competence, and the assessment of instructional implementation. While all are relevant in their own way for determining theoretical bases for media use, the last one--instructional implementation --is of direct interest.

There are current theses about media which say that media, in fact, do not make any difference in learning--at least as measured by typical research paradigms that tend to manipulate the situational variables more

than the intrinsic attributes of the media themselves. But there is a shift occurring. This shift is moving from the more incidental role of media in instruction to a greater emphasis upon the interacting relationships among the content and symbol systems of media with specific learner characteristics. A case in point is the hypothesis of Salomon that the greater the similarity between the coding systems in the message and the coding system in the repertoire of the learner, the more likely learning will occur. Such a shift is also seen in Olson's (1972) theory of instructional means, derived in part from Bruner and McLuhan which says that technologies and techniques used with learners are accompanied by the development in learners of relevant cognitive skills.

What, then, are the most prominent theories that have evolved in the last decade? For current opinions, I am indebted to Clark and Salomon (1984) for a chance to read the final draft of a manuscript they have prepared for the Third Handbook of Research on Teaching. Those of you who have studied the 1974 National Society of the Study of Education on Media and Symbols will find some of these theories familiar.

The first has to do with the nature of symbol systems, the avenues through which all of us must perceive our environments and gain our information. It offers a theoretical foundation for differentiating among symbol systems and may provide a systematic way for defining those aspects of symbols that may be not only pertinent to certain types of information,

but also that may serve as devices by which learners may process information. I am referring to Goodman's Symbol System Theory, discussed by Gardner and others (1974).

A symbol is defined as anything that can be used in a referential way and that can be organized into systems. Goodman divides symbols into two large categories of being either notational or non-notational. By notational, he means that a symbol must meet the criteria of being unambiguous, such as the concept "one is always one"; it must be semantically disjointed--that is, no two characters can have a common referent--and it must have a finite differentiation. For example, the signs for the bass or treble clef in musical notation are finite differentiations and remain so, assuming no other meaning. Non-notationality, on the other hand, suggests symbols that are dense, replete with information, and subject to a variety of interpretations. A picture may be classified as non-notational because it may be interpreted in a variety of ways. There can, however, be symbols within the picture that can be finite in their meaning and designation, and hence notational. While this presentation is not the place for a detailed discussion of Goodman's model, there is an additional model worth mentioning which complements Goodman's work. It is also discussed in the NSSE Yearbook. It is Gross's identification of various information modes that contain symbol systems peculiar to given sets or types of information. The modes, which he calls primary, are linguistic, socio-gestural, iconic, logico-mathematical, and musical. Each of these categories provides a

system for differentiating the specificity of certain symbols. Of interest to us is that these may provide a systematic basis for answering questions about the types of symbols required by learners to acquire and process certain kinds of information. They may also be useful for determining whether learners utilize these symbols as tools in their own cognitive processing.

Gross has also formulated two other general symbol classifications which utilize primary modes in idiosyncratic ways. One is the derived mode, such as poetry, dance, and film. The other is the technical mode, suggesting the peculiar language of the sciences, engineering, technologies, and architecture.

A second prominent theoretical formulation of current use is that of Olson (1972, 1974), referred to earlier. Calling his theory one of instructional means, Olson suggests two aspects of media that affect learning. One is that the content of a medium relates to the knowledge acquired. That is, the content may assist in the acquisition of rules and principles that are invariant features across different activities, a kind of transfer of knowledge generated by the medium. The other aspect relates to the acquisition of skills that are required to utilize the information presented in the medium. The coding system and means of presenting the information may become tools for utilizing similar coding systems or means.

Olson also suggests that there is a significant difference between an

"utterance" and "text" which have direct implications for our understanding of the functions of media. Olson characterized an utterance as oral language that is flexible, unspecified, with a low degree of conventionalization, and that is negotiable in a social setting. Written language, on the other hand, demands precision and explictness of meaning. It serves to maintain philosophical, scientific, analytic knowledge. Thus, as learners are schooled in written language, they develop the skill and habituation to textual material, or a literacy bias, as Olson describes it. Thus, it may be that long training and practice in text materials may inhibit learning from other than text. This may be a partial explanation for the finding of Guba when he observed the visual attention of subjects who watched science demonstrations on television. At times their eyes went out of focus and they tended to watch the mouth of the demonstrator more often than the details of the demonstration. It may be that we perpetuate dependence upon text by utilizing it continuously in our testing procedures and thus condition learners not to observe other forms of information.

The third theoretical model is Salomon's Media Attribute Theory (1979, 1981), which he has developed over a number of years. The theory says, in effect, that both media and the human mind employ symbol systems for acquiring, storing, and manipulating information. Also, he contends that some of the tools of cognition are the consequence of employing symbols that were inherent in media. In essence, he has suggested a supplantation theory which says that it is possible for technological devices, such as a

zoom lens, to provide an observable analogy to the mental process of proceeding from a generalization to a particular and back to a generalization again. The use of a zoom lens to assist field-dependent students to observe details in a picture is offered by Salomon as tentative evidence of this phenomenon. Clark (1983) on the other hand, contended that zooming is not a media attribute, but a method for enlarging and focusing.

In addition to these three theories, there is also the current question that cuts across all of them. It is the controversy about whether humans process information through images or propositions. Those who support the imaging hypothesis contend that a mental image is analogous to the perception of the actual object. In the opposite camp, those who deny the possibility of imaging contend that there is no direct connection between what one observes and the final knowledge acquired, because all stimulus situations are affected by beliefs, goals, previous knowledge, experience, and emotional states. Final knowledge is governed by rationality--that is, all stimuli are acted upon by the learner's repertoire of the moment.

Also related to these three theoretical positions is the question whether media attributes or codes are in fact unique in conveying information. Since learners acquire knowledge through many different forms of media, there must be something operating beyond the hoped-for uniqueness of specific media. Researchers apparently must look to the cognitive processes learners use to manipulate information, or search for factors that may have nothing to do with media directly.

There is some evidence supporting the notion that factors other than media have more influence on learner responses to media that the element or coding systems within media themselves. Clark and Salomon (1984) suggest that one relates to the effects of learner anticipation of media in terms of efforts that must be invested in their use. It appears that where media are perceived as critical to future performance, learners will expend more effort. Where media are perceived as entertainment, less effort is expended. Twenty years ago Greenhill (1967) pondered why television instruction did not often prove superior when compared with traditional university instruction. He hypothesized that good television instruction required less expenditure of effort by students; therefore, they put more time into traditional courses which were less well presented. Thus, television instruction was not given a fair test, leading to the "no significant difference" conclusion.

Clark (1983) reviewed a number of studies having to do with student effort. Among his findings was the phenomenon of high-ability students choosing structured methods and media because they perceived that they would have to expend less effort. Lower-ability students, on the other hand, chose less-structured media and more discovery-oriented methods because they wished to avoid the failure that may have come from being unable to fulfill the requirements of the structured and directed situation. In a recent letter to me, Clark (11/15/83) has this to say: "I have arrived at a very reluctant conclusion that media do not contribute much to

learning . . . and only minimally to decoding. I do think that the symbol system approach has promise for instructional design but not much theoretical importance. . . ." He thinks that media contribute only "indirectly through variations in persistence which are contributed by our subjective compressions of how much effort is required to learn from various media."

Where, then, are we in our search for theoretical foundations that have viability? I would encapsulize directions in the theoretical bases of our research from one of regarding the learner as being reactive and under stimulus control, to one in which the learner is much more a participant in determining what effects media have upon the transmission of information, upon learner perceptions, and upon cognitive processes themselves. It is not only a matter of how learners perceive the messages conveyed via media, but also one of discovering whether and how learners utilize the coding systems of media as tools for manipulating information. In essence, the attempt to prove media utility is a dead issue, as is the attempt to depend upon gross comparative studies as sources for definitive answers about media characteristics and their influences upon the specifics of learner behavior. Some fruitful questions to ask may be:

-- Do the coding systems of media actually serve as tools for various aspects of cognition, or do they not?

-- Do skills required for utilizing content and methodologies associated with media become skills in cognition?

-- What methods might we generate to make efficient and effective collaboration with learners in discovering the uniqueness of media?

-- Can the inherent qualities of media and related technological devices act to supplant and/or complement given mental activities?

-- Are the concepts of notationality and non-notationality viable paradigms for determining the specific functions of media coding systems?

-- What methodologies best complement the uses of media?

-- Are there unique qualities of given media that fit particular learning needs, or is it only a case of differing methodologies that make the differences in learner responses to media?

-- In the final analysis, are learner attitudes and efforts in using media as contended by Clark the only evidence we can depend on to account for media effects?

Turning finally to the questionnaire, it was devised by four graduate students and myself as a way of sampling the opinions of theoreticians and researchers in media. The attempt was to select fifty statements that seemed to appear in current literature and did not pretend to be exhaustive or foolproof. While the questionnaire was titled, "Theories About Media and Learning," some respondents suggested--and perhaps rightly--that the statements were really hypotheses. The argument is somewhat semantic and dependent upon the definitional line between a hypothesis and a theory.

All but nine of the hundred persons who were sent the questionnaire were on the membership list of RTD. Forty-two returns were received in time for inclusion in calculations. Since the questionnaires were anonymous responses, there is no way of knowing who were involved, with the rare exception of a signature or two accompanying a comment.

Frequency data were determined for each of the seven categories in the "Valid to Not Valid" scale and for the choices of whether a particular statement was important or not important for research in our field. Means and standard deviations were calculated, as well as a correlation coefficient for the relationship between the not important category and each statement frequency data. The handouts provide a compilation of the data that you may match with a copy of the questionnaire.

Looking first at the statements that respondents regarded as not valid, thirteen had large enough frequency to quality. My intention is not to engage in a lengthy discussion of these statements, but simply to raise your consciousness of what 42 colleagues think.

Statements Judged Not Valid

3. Developing "literacy" in the interpretation of non-verbal information by learners is more a matter of being exposed to a wide variety of non-verbal experiences than it is a matter of being taught to observe nuances in non-verbal materials.

7. Media are capable of insuring anticipated learning outcomes.

9. Media attributes affect learners in the same way.

11. Structuring media experiences insures common learning of information.

16. Random behavior in human performance is due to the way people interpret media.

20. Multiple image instruction contributes to greater learning and retention than single image instruction.

25. Each message has a best message form and carrier.

27. The technical quality of the conveyance system does not affect the fidelity of the original message.

31. There is no competition when similar information is presented in two media.

36. The less the information in a medium is like the "reality" it represents, the less the student will learn about reality."

42. Verbal memory and pictorial memory are independent of each other.

44. Recall of pictorial information requires verbal processing for retrieval.

48. Information overload is essential to impress or exhilerate the learner.

Statements Judged Valid

At the opposite end of the scale, there were fourteen statements that were regarded by the respondents as valid and important for research. Each of these had significant correlation coefficients.

2. The greater the match between learner experience and media attributes, the greater the likelihood of learner acceptance of media content.

4. Overt/covert responses of learners to "media" experiences are more likely to result in greater memory storage than covert/passive responses.

5. The more a symbol system matches the critical features of an idea or event, the more appropriate it is.

6. Fitness of a message form depends upon the characteristics of the information.

12. Negative teacher attitude toward a media presentation creates negative student attitudes.

14. Presenting various forms of media provides the greatest compatibility with the nature of idiosyncratic brains.

15. It is critical for effective media usage to know the range of coding elements available in each learner's repertoire.

17. Sequential build-up of illustrations leads to better understanding.

19. Excessive detail interferes with transmission of intended information.

21. The advantage of visual over auditory materials increases for more difficult materials.

24. The more similar the coding schemes in the teacher's and student's repertoires the greater the possibility for learning to take place.

26. Messages, message forms, and conveyance systems interact to convey the intended message.

29. Cultural differences affect learner interpretations of media.

34. Learners have difficulty discriminating between subjectivity and objectivity in their interpretation of messages.

It is evident from the questionnaire that the largest number of statements refer to media as instruments that affect learner performance. Only one in the not-valid category, number 16, may be consonant with Clark's views that there are factors, other than media characteristics, that affect learner responses. Most of the statements that were regarded as valid and important for research followed the research paradigm which is looking for a match between the coding, critical elements in media, and the repertoire of the learner.

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Appendix

1. Questionnaire
2. Data for 42 respondents to questionnaire

THEORIES ABOUT MEDIA AND LEARNING

	VALID	UN-DECIDED	NOT VALID	NOT IMPORTANT	IMPORTANT
1. Learning is enhanced when the student controls at least part of the presentation of information.					
2. The greater the match between learner experiences and media attributes, the greater the likelihood of learner acceptance of media content.					
3. Developing "literacy" in the interpretation of non-verbal information by learners is more a matter of being exposed to a wide variety of non-verbal experiences than it is a matter of being taught to observe nuances in non-verbal materials.					
4. Overt/active responses of learners to "media" experiences are more likely to result in greater memory storage than covert/passive responses.					
5. The more a symbol system matches the criterial features of an idea or event, the more appropriate it is.					
6. Fitness of a message form depends upon the characteristics of the information.					
7. Media are capable of insuring anticipated learning outcomes.					
8. Media related to similar information converge knowledge and diverge as to skills required by learners to process different media.					
9. Media attributes affect learners in the same way.					
10. Certain media may accelerate learning by providing tools or analogs for mental activities.					
11. Structuring media experiences insures common learning of information.					
12. Negative teacher attitude toward a media presentation creates negative student attitudes.					
13. Teacher follow-up to a media presentation affects how much students learn from it.					

	VALID	UN-DECIDED	NOT VALID	NOT IMPORTANT	IMPORTANT
14. Presenting various forms of media provides the greatest compatibility with the nature of idiosyncratic brains.					
15. It is critical for effective media usage to know the range of coding elements available in each learner's repertoire.					
16. Random behavior in human performance is due to the way people interpret media.					
17. Sequential build-up of illustrations leads to better understanding.					
18. Reinforcing questions dispersed through instructional material are not equally effective for all learners.					
19. Excessive detail interferes with transmission of intended information.					
20. Multiple image instruction contributes to greater learning and retention than single image instruction.					
21. The advantage of visual over auditory materials increases for more difficult material.					
22. Visual information is remembered longer than aural information.					
23. Gender differences can be expected among learner responses to media.					
24. The more similar the coding schemes in the teacher's and student's repertoire the greater the possibility for learning to take place.					
25. Each message has a best message form and carrier.					
26. Messages, message forms, and conveyance systems interact to convey the intended message.					
27. The technical quality of the conveyance system does not affect the fidelity of the original message.					
28. Media in combination are superior to a single medium.					

	VALID	UN-DECIDED	NOT VALID	NOT IMPORTANT	IMPORTANT
29. Cultural differences affect learner interpretations of media.					
30. Integrated code strategies enhance acquisition and retrieval of concepts.					
31. There is no competition when similar information is presented in two media.					
32. Instructional visuals for use with highly anxious students should contain critical information salient to the students.					
33. Both author and audience contribute to a message.					
34. Learners have difficulty discriminating between subjectivity and objectivity in their interpretation of messages.					
35. Separate information received via separate media tends to be processed independently, but integrated with difficulty.					
36. The less the information in a medium is like the "reality" it represents, the less the student will learn about "reality."					
37. Irrelevant cues in message forms interfere with learning.					
38. To store information, learners filter out irrevelant cues.					
39. Learner differences account for varying responses to media more than differences among media attributes.					
40. Instructional procedures which complement media usage are less beneficial to high ability students than to low ability students.					
41. High ability learners, more than low ability learners, need high density and complex information to challenge their abilities.					
42. Verbal memory and pictorial memory are independent of each other.					

	VALID	UN-DECIDED	NOT VALID	NOT IMPORTANT	IMPORTANT
43. Verbal interference conflicts less with pictorial information than with verbal information.					
44. Recall of pictorial information requires verbal processing for retrieval.					
45. The human perceptual system demands sufficient fixation time for detail to be observed.					
46. Fixation for pictorial material requires less time than for verbal materials.					
47. The amount of information an observer can absorb depends on the level of analysis required.					
48. Information overload is essential to impress or exhilerate the learner.					
49. Redundant information in multi-image presentations shortens fixation time for observing detail.					
50. The perception and storage of information is a dual coding process (images and symbols).					

Please use the space below to add any theories which you think might have been overlooked in this brief survey.

UPPER NUMBER = N
LOWER NUMBER = % of total

RESULTS - QUESTIONNAIRE (42 returns out of 100) — THEORIES (HYPOTHESES) MEDIA AND LEARNING

G. M. TORKELSON - 1983

QUES NO	VALID			UN DECIDED	NOT VALID			N	MN	STD DEV	NOT IMPORTANT	IMPORTANT	N	MN	STD DEV	SIGN. OF CORRELATION (NOT. IMP WITH QUES
1	17 41.5	11 26.8	4 9.8	5 12.2	1 2.4	1 2.4	2 4.9	41	2.341	1.667	4 9.8	37 90.2	41	1.902	.300	
2	8 20.5	10 25.6	8 20.5	8 20.5	2 5.1	2 5.1	1 2.6	39	2.897	1.553	7 19.4	29 80.6	36	1.806	.401	.001
3	2 5.0	5 12.5	5 12.5	9 22.5	3 7.5	10 25.0	6 15.0	40	4.500	1.826	9 24.3	28 75.7	37	1.757	.435	
4	15 37.5	12 30.0	3 7.5	2 5.0	2 5.0	3 7.5	3 7.5	40	2.625	1.970	3 7.5	37 92.5	40	1.925	.267	.042
5	8 20.0	11 27.5	6 15.0	8 20.0	2 5.0	2 5.0	3 7.5	40	3.075	1.789	9 23.7	29 76.3	38	1.763	.431	.015
6	9 23.7	15 39.5	3 7.9	8 21.1	1 2.6	1 2.6	1 2.6	38	2.579	1.482	7 18.9	30 81.1	37	1.811	.397	.001
7	1 2.6	7 17.9	3 7.7	3 7.7	0 0	8 20.5	17 43.6	39	5.205	2.105	12 30.8	27 69.2	39	1.692	.468	
8	1 4.2	3 12.5	2 8.3	14 58.3	1 4.2	1 4.2	2 8.3	24	3.917	1.412	11 50.0	11 50.0	22	1.500	.512	
9	0	2 5.3	1 2.6	3 7.9	3 7.9	10 26.3	19 50.0	38	5.974	1.423	17 43.6	22 56.4	39	1.564	.502	
10	15 35.7	10 23.8	10 23.8	5 11.9	0	1 2.4	1 2.4	42	2.333	1.408	2 5.1	37 94.9	37	1.946	.223	
11	5 12.5	1 2.5	5 12.5	6 15.0	3 7.5	10 25.0	10 25.0	40	4.775	2.044	11 29.7	26 70.3	37	1.703	.463	
12	14 33.3	10 23.8	6 14.3	6 14.3	4 9.5	1 2.4	1 2.4	42	2.595	1.609	5 13.5	32 86.5	37	1.865	.347	.003
13	13 31.0	15 35.7	6 14.3	6 14.3	0	0	2 4.8	42	2.357	1.462	4 9.8	37 90.2	41	1.902	.300	
14	5 14.7	3 8.8	6 17.6	10 29.4	2 5.9	5 14.7	3 8.8	34	3.824	1.834	12 36.4	21 63.6	33	1.636	.489	.021
15	6 15.0	8 20.0	8 20.0	8 20.0	5 12.5	4 10.0	1 2.5	40	3.350	1.657	12 31.6	26 68.4	38	1.684	.471	.001
16	3 7.3	1 2.4	4 9.8	11 26.8	0	9 22.0	13 31.7	41	5.024	1.904	17 50.0	17 50.0	34	1.500	.508	
17	3 7.7	17 43.6	8 20.5	8 20.5	1 2.6	0	2 5.1	39	2.872	1.380	6 16.7	30 83.3	36	1.833	.378	.002
18	7 17.5	17 42.5	4 10.0	4 10.0	1 2.5	6 15.0	1 2.5	40	2.925	1.774	6 17.1	29 82.9	35	1.829	.382	
19	14 33.3	14 33.3	5 11.9	5 11.9	1 2.4	1 2.4	2 4.8	42	2.429	1.610	8 20.5	31 79.5	39	1.795	.409	.050
20	0	3 7.1	2 4.8	10 23.8	7 16.7	9 21.4	11 26.2	42	5.190	1.534	11 29.7	26 70.3	37	1.703	.463	.007
21	6 14.6	6 14.6	8 19.5	11 26.8	0	6 14.6	4 9.8	41	3.659	1.879	5 13.5	32 86.5	37	1.865	.347	.041
22	4 10.0	10 25.0	2 5.0	11 27.5	4 10.0	3 7.5	6 15.0	40	3.850	1.942	3 8.6	32 91.4	35	1.914	.284	
23	1 2.4	7 17.1	5 12.2	12 29.3	6 14.6	4 9.8	6 14.6	41	4.444	1.700	10 28.6	25 71.4	35	1.714	.458	
24	12 30.0	9 22.5	11 27.5	2 5.0	2 5.0	1 2.5	3 7.5	40	2.700	1.757	11 28.9	27 71.1	38	1.711	.460	.001

UPPER NUMBER = N
LOWER NUMBER = % of total

RESULTS - QUESTIONNAIRE - (42 returns out of 100)

THEORIES (HYPOTHESES) MEDIA AND LEARNING
1983 - G.M. TORKELSON

QUES NO	VALID			UN DECIDED	NOT VALID			N	MN	STD DEV	NOT IMPORTANT	IMPORTANT	N	MN	STD DEV	SIGN. OF CORRELATN NOT IMP WITH IMP
25	0	3 7.3	5 12.2	9 22.0	5 12.2	7 17.1	12 29.3	41	5.073	1.664	12 34.3	23 65.7	35	1.657	.482	
26	11 26.8	17 41.5	8 19.5	2 4.9	1 2.4	1 2.4	1 2.4	41	2.317	1.350	9 24.3	28 75.7	37	1.757	.435	.011
27	1 2.5	3 7.5	5 12.5	5 12.5	5 12.5	10 25.0	11 27.5	40	5.100	1.766	7 19.4	29 80.6	36	1.806	.401	
28	2 5.0	6 15.0	3 7.5	9 22.5	6 15.0	4 10.0	10 25.0	40	4.575	1.920	7 18.4	31 81.6	38	1.816	.393	
29	21 50.0	13 13.0	7 16.7	0	0	1 2.4	0	42	1.762	1.008	4 10.3	35 89.7	39	1.897	.307	.044
30	7 19.4	5 13.9	9 25.0	12 33.3	1 2.8	2 5.6	0	36	3.028	1.383	6 20.0	24 80.0	30	1.800	.407	
31	2 5.0	2 5.0	4 10.0	8 20.0	5 12.5	11 27.5	8 20.0	40	4.925	1.730	7 20.0	28 80.0	35	1.800	.406	
32	8 20.0	11 27.5	6 15.0	9 22.5	3 7.5	2 5.0	1 2.5	40	2.950	1.584	8 23.5	26 76.5	34	1.765	.431	
33	19 46.3	10 24.4	9 22.0	2 4.9	0	1 2.4	0	41	1.951	1.139	5 13.9	31 86.1	36	1.861	.351	
34	8 19.5	8 19.5	11 26.8	10 24.4	3 7.3	1 2.4	0	41	2.878	1.327	7 21.2	26 78.8	33	1.788	.415	.050
35	3 7.5	2 5.0	6 15.0	10 25.0	5 12.5	10 25.0	4 10.0	40	4.450	1.709	7 21.2	26 78.8	33	1.788	.415	
36	4 9.8	7 17.1	2 4.9	8 19.5	4 9.8	6 14.6	10 24.4	41	4.439	2.098	7 14.4	29 80.6	36	1.806	.401	.035
37	18 42.9	9 21.4	6 14.3	2 4.8	1 2.4	4 9.5	2 4.8	42	2.500	1.877	3 8.6	32 91.4	35	1.914	.284	
38	8 19.0	13 31.0	2 4.8	7 16.7	8 19.0	2 4.8	2 4.8	42	3.190	1.798	5 13.5	32 86.5	37	1.865	.347	
39	12 30.0	8 20.0	7 17.5	9 22.5	2 5.0	2 5.0	0	40	2.675	1.492	3 8.6	32 91.4	35	1.914	.284	
40	8 19.5	7 17.1	3 7.3	12 29.3	2 4.9	5 12.2	4 9.8	41	3.585	1.962	7 17.9	32 82.1	39	1.821	.389	
41	5 12.5	10 25.0	8 20.0	9 22.5	1 2.5	6 15.0	1 2.5	40	3.325	1.670	6 15.4	33 84.6	39	1.846	.366	
42	2 5.0	5 12.5	2 5.0	10 25.0	2 5.0	12 30.0	7 17.5	40	4.725	1.840	3 7.9	35 92.1	38	1.921	.273	
43	2 4.9	13 31.7	10 24.4	9 22.0	2 4.9	2 4.9	3 7.3	41	3.341	1.575	7 18.4	31 81.6	38	1.816	.393	
44	2 4.9	4 9.8	3 7.3	10 24.4	3 7.3	10 24.4	9 22.0	41	4.805	1.835	5 13.5	32 86.5	37	1.865	.347	
45	12 29.3	14 34.1	6 14.6	2 4.9	5 12.2	2 4.9	0	41	2.572	1.519	5 12.8	34 87.2	39	1.872	.339	
46	5 12.5	4 10.0	5 12.5	12 30.0	5 12.5	5 12.5	4 10.0	40	3.975	1.804	5 13.5	32 86.5	37	1.865	.347	
47	11 28.2	7 17.9	12 30.8	5 12.8	1 2.6	2 5.1	1 2.6	39	2.692	1.542	4 10.3	35 89.7	39	1.897	.307	
48	0	0	1 2.4	4 9.8	4 9.8	10 24.4	22 53.7	41	6.171	1.116	13 33.3	26 66.7	39	1.667	.478	
49	1 2.6	3 7.7	8 20.5	15 38.5	1 2.6	4 10.3	7 17.9	39	4.353	1.562	14 40.0	21 60.0	35	1.600	.497	
50	4 10.0	10 25.0	6 15.0	14 25.0	2 5.0	3 7.5	1 2.5	40	3.325	1.492	6 15.0	34 85.0	40	1.850	.362	